

REMARKS

This is in response to the Office Action mailed on June 12, 2007. Claims 1-22 were pending in the application, and the Examiner rejected claims 1-3, 6-15 and 18-22 and objected to claims 4-5 and 16-17, indicating that they contained allowable subject matter. With this amendment, claims 1, 3-6, 13, 16-17 and 20 are amended, claims 2, 10-12 and 14-15 are canceled, and the remaining claims are unchanged in the application.

On page 2 of the Office Action, the Examiner noted a misspelling in item 216 of FIG. 2B. An amended drawing is submitted correcting the misspelling.

On page 2 of the Office Action, the Examiner rejected claims 1, 10-15 and 18-22 under 35 U.S.C. §102(b) as being anticipated by the Gasperin et al. article "Using Syntactic Contexts for Measuring Word Similarity" (hereinafter Gasperin et al.). Of these claims, claims 1, 10, 13 and 20 are independent claims.

At the bottom of page 8, the Examiner indicated that claims 4-5 and 16-17 contained allowable subject matter. The Examiner indicated that the prior art does not teach using either a co-occurrence frequency or MI measure, depending on the frequency of occurrence as claimed in these claims. Applicant agrees with the Examiner and thanks the Examiner for the acknowledgment as to allowable subject matter.

Applicant would also submit, however, that the references do not even teach choosing between two or more different weighting measures to weight a similarity measure, based upon whether the word under analysis, and its corresponding dependency structure, have appeared with a frequency that meets a threshold frequency value. In other words, the present system appreciates the fact that different weighting measures should be used to weight a similarity measure, because the different weighting measures perform differently, depending upon how often the word and its associated dependency structure appear in the training data. As described in the present specification, if the words and its associated dependency structure appear very frequently, one weighting measure performs better. However, if the word and its associated dependency structure appear relatively infrequently, a different weighting measure performs better. Mutual information and co-occurrence frequency are two examples given in the present

specification for weighting the similarity measure, and the Examiner has indicated that choosing from among a plurality of different weighting measures is neither taught nor suggested by the references.

Applicant has now amended independent claim 1 to include “selecting one of a plurality of different weighting measures to weight a similarity measure based on whether a frequency indicator indicative of a frequency of occurrence of a second dependency structure in training data meets a frequency threshold value; and calculating the similarity between the first and second words based on the similarity measure weighted with the selected weighting measure.” Because the references do not teach or suggest any type of system that employs at least two different weighting measures for calculating the similarity between words, where the particular weighting measure to be used in any given instance is chosen based on the frequency of occurrence of the word and its associated dependency structure, the references can neither teach nor suggest independent claim 1. Therefore, Applicant submits that independent claim 1 is allowable.

Independent claim 13 is drawn to a natural language processing system that includes a data store storing head words and associated attributes, wherein the attributes include a related word and a relation type indicator along with a frequency indicator. The natural language processing system of claim 13 also includes a similarity generator configured to receive an input word and an associated input dependency structure and to calculate the similarity between the input word and the head words in the data store based on the input words and the associated input dependency structure and the head words and associated dependency structures “using a similarity measure that weights a similarity corresponding to a given head word with a first weighting measure if the frequency indicator associated with the given head word meets a predetermined frequency threshold value and with a second weighting measure, different from the first weighting measure, if the frequency indicator does not meet the predetermined frequency threshold value.”

The references cited by the Examiner do not include such a similarity generator. The references do not show a natural language processing system that calculates a similarity

between two different words in this fashion. Specifically, the references do not teach or suggest a similarity generator that applies one of at least two different weighting measures to a similarity measure, wherein the choice of which weighting measure to apply is based on how frequently the word, and its associated dependency structure, appeared in training data. This is simply neither taught nor suggested by the references cited by the Examiner. Gasperin et al. talks about a number of different equations that can be used to calculate similarity between words. However, Gasperin et al. is simply evaluating these different techniques. All systems in Gasperin et al. choose one equation to apply. There is no teaching or discussion, nor even mention, that the similarity measure can be weighted, during runtime, by one of a plurality of different weighting measures, depending on the frequency with which the word under analysis has appeared in training data. This is simply neither taught nor suggested by the references cited by the Examiner. Therefore, Applicant submits that independent claim 13 is allowable.

Independent claim 20 is drawn to a system for calculating similarity between words using annotated data. The system includes a parser and a data store, along with a similarity generator that generates a similarity “using a similarity measure that weights a similarity corresponding to a given word in the data store with a first weighting measure if the frequency indicator associated with the given word meets a predetermined frequency threshold value and with a second weighting measure, different from the first weighting measure, if the frequency indicator does not meet the predetermined frequency threshold value.” Because the references neither teach nor suggest such a system, which applies one of a plurality of different weighting measures, depending on frequency, it cannot teach or suggest independent claim 20. Therefore, Applicant submits that independent claim 20 is allowable as well.

In conclusion, Applicant submits that independent claims 1, 13 and 20 are allowable over the references cited by the Examiner. Applicant further submits that dependent claims 3-9, 16-19 and 21-22, which depend either directly or ultimately from the independent claims, are allowable as well. Reconsideration and allowance of claims 1, 3-9, 13, and 16-22 are respectfully requested.

between two different words in this fashion. Specifically, the references do not teach or suggest a similarity generator that applies one of at least two different weighting measures to a similarity measure, wherein the choice of which weighting measure to apply is based on how frequently the word, and its associated dependency structure, appeared in training data. This is simply neither taught nor suggested by the references cited by the Examiner. Gasperin et al. talks about a number of different equations that can be used to calculate similarity between words. However, Gasperin et al. is simply evaluating these different techniques. All systems in Gasperin et al. choose one equation to apply. There is no teaching or discussion, nor even mention, that the similarity measure can be weighted, during runtime, by one of a plurality of different weighting measures, depending on the frequency with which the word under analysis has appeared in training data. This is simply neither taught nor suggested by the references cited by the Examiner. Therefore, Applicant submits that independent claim 13 is allowable.

Independent claim 20 is drawn to a system for calculating similarity between words using annotated data. The system includes a parser and a data store, along with a similarity generator that generates a similarity “using a similarity measure that weights a similarity corresponding to a given word in the data store with a first weighting measure if the frequency indicator associated with the given word meets a predetermined frequency threshold value and with a second weighting measure, different from the first weighting measure, if the frequency indicator does not meet the predetermined frequency threshold value.” Because the references neither teach nor suggest such a system, which applies one of a plurality of different weighting measures, depending on frequency, it cannot teach or suggest independent claim 20. Therefore, Applicant submits that independent claim 20 is allowable as well.

In conclusion, Applicant submits that independent claims 1, 13 and 20 are allowable over the references cited by the Examiner. Applicant further submits that dependent claims 3-9, 16-19 and 21-22, which depend either directly or ultimately from the independent claims, are allowable as well. Reconsideration and allowance of claims 1, 3-9, 13, and 16-22 are respectfully requested.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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